

## **What is claimed is:**

**[Claim 1]** In a motor vehicle comprising a firewall extending between an engine compartment and a passenger compartment, and containing at least one opening therethrough for passage of a conduit, a sound attenuating dashmat mounted to the passenger compartment side of the firewall and having an opening in registry with the at least one opening in the firewall, and optionally, a vehicle component mounted to the firewall in the passenger compartment adjacent the openings in the firewall and the dashmat and communicating with the conduit, the improvement comprising:

an acoustic seal surrounding the openings in the firewall and the dashmat and extending upwardly from an upper surface of the dashmat toward the passenger compartment, the acoustic seal having sound absorbing and sound barrier components to attenuate sound that passes through the openings in the firewall and the dashmat and above the upper surface of the dashmat; wherein the acoustic seal attenuates the transmission of sound from the engine compartment into the passenger compartment of the motor vehicle.

**[Claim 2]** A motor vehicle according to claim 1, wherein the acoustic seal further comprises an upwardly extending side wall and a top wall of a sound barrier material.

**[Claim 3]** A motor vehicle according to claim 2, wherein the sound barrier material comprises a dense, resilient, flexible synthetic plastic.

**[Claim 4]** A motor vehicle according to claim 2, wherein the sound barrier material is selected from the group consisting of a filled thermoplastic elastomer, an unfilled thermoplastic elastomer, an elastomer-modified polyurethane, a thermoset polymer, a polyurethane, and a thermoplastic.

**[Claim 5]** A motor vehicle according to claim 2, wherein the acoustic seal side wall is integrally formed with the sound barrier of the dashmat.

**[Claim 6]** A motor vehicle according to claim 2, wherein the acoustic seal side wall is formed separately from the sound barrier of the dashmat.

**[Claim 7]** A motor vehicle according to claim 1, wherein the acoustic seal further comprises an annular body of a sound absorber material.

**[Claim 8]** A motor vehicle according to claim 7, wherein the sound absorber material comprises a low density, porous material.

**[Claim 9]** A motor vehicle according to claim 7, wherein the sound absorber material is selected from the group consisting of an expanded flexible polyurethane, a flexible fibrous material, a non-woven glass fiber mat, and a shoddy cotton.

**[Claim 10]** A motor vehicle according to claim 7, wherein the annular body is integrally formed with the sound absorbing layer of the dashmat.

**[Claim 11]** A motor vehicle according to claim 7, wherein the annular body is formed separately from the sound absorbing layer of the dashmat.

**[Claim 12]** A motor vehicle according to claim 11, wherein the annular body is fastened to the sound absorbing layer.

**[Claim 13]** A motor vehicle according to claim 1, wherein the dashmat comprises a barrier layer and a sound absorbing layer.

**[Claim 14]** A motor vehicle according to claim 13, wherein the barrier layer comprises a dense, resilient, flexible synthetic plastic.

**[Claim 15]** A motor vehicle according to claim 13, wherein the barrier layer is selected from the group consisting of a barium sulfate filled polypropylene, a thermoplastic elastomer, an elastomer-modified polyurethane, a thermoset plastic, a polyurethane, and a filled thermoplastic.

**[Claim 16]** A motor vehicle according to claim 13, wherein the sound absorbing layer comprises a foam plastic.

**[Claim 17]** A motor vehicle according to claim 13, wherein the sound absorbing layer is selected from the group consisting of an expanded flexible polyurethane, a flexible fibrous material, a nonwoven glass fiber mat, and a shoddy cotton.

**[Claim 18]** A motor vehicle according to claim 1, wherein the acoustic seal is in contact with the vehicle component when the vehicle component is mounted to the firewall.

**[Claim 19]** A dashmat adapted to be mounted to a vehicle firewall separating an engine compartment and a passenger compartment, the firewall containing at least one opening therethrough for passage of a conduit, the dashmat having an opening adapted to be placed in registry with the at least one opening in the firewall, the improvement comprising:

an acoustic seal surrounding the opening in the dashmat and extending upwardly from an upper surface of the dashmat, the acoustic seal having sound absorbing and sound barrier components that are shaped and adapted to attenuate sound that passes through the opening in the dashmat; wherein the acoustic seal is adapted to attenuate the transmission of sound from the engine compartment into the passenger compartment of the motor vehicle when the dashmat is mounted to the firewall.

**[Claim 20]** A dashmat according to claim 19 wherein the acoustic seal further comprises an upwardly extending side wall and a top wall of a sound barrier material.

**[Claim 21]** A dashmat according to claim 20 wherein the sound barrier material comprises a dense, resilient, flexible synthetic resin.

**[Claim 22]** A dashmat according to claim 20 wherein the sound barrier material is selected from the group consisting of a filled thermoplastic elastomer, an unfilled thermoplastic elastomer, an elastomer-modified polyurethane, a thermoset polymer, a polyurethane, and a thermoplastic polymer.

**[Claim 23]** A dashmat according to claim 20 wherein the dashmat includes a sound barrier layer and the acoustic seal side wall is integrally formed with the sound barrier layer of the dashmat.

**[Claim 24]** A dashmat according to claim 20 wherein the acoustic seal side wall is formed separately from the sound barrier of the dashmat.

[Claim 25] A dashmat according to claim 20 wherein the acoustic seal further comprises a sound absorber material.

[Claim 26] A dashmat according to claim 25 wherein the sound absorber material comprises a low density, porous material.

[Claim 27] A dashmat according to claim 25 wherein the sound absorber material is selected from the group consisting of an expanded flexible polymer, a flexible fibrous material, a non-woven glass fiber mat, and a shoddy cotton.

[Claim 28] A dashmat according to claim 25 wherein the dashmat has a layer of sound adsorbing material and the acoustic seal sound absorber material is integrally formed with the sound absorbing layer of the dashmat.

[Claim 29] A dashmat according to claim 25 wherein the acoustic seal sound absorber material is formed separately from the dashmat.

[Claim 30] A dashmat according to claim 29 wherein the dashmat has a layer of sound adsorbing material and the acoustic seal sound absorber material is fastened to the sound absorbing layer.

[Claim 31] A dashmat according to claim 19 wherein the dashmat comprises a barrier layer and a sound absorbing layer.

[Claim 32] A dashmat according to claim 31 wherein the barrier layer comprises a dense, resilient, flexible synthetic plastic.

[Claim 33] A dashmat according to claim 31 wherein the barrier layer is selected from the group consisting of a barium sulfate filled polypropylene, a thermoplastic elastomer, an elastomer-modified polyurethane, a thermoset plastic, a polyurethane, and a filled thermoplastic.

[Claim 34] A dashmat according to claim 31 wherein the sound absorbing layer comprises a foam plastic.

[Claim 35] A dashmat according to claim 31 wherein the sound absorbing layer is selected from the group consisting of an expanded flexible polyurethane, a flexible fibrous material, a nonwoven glass fiber mat, and a shoddy cotton.

**[Claim 36]** A dashmat according to claim 19 wherein the acoustic seal further comprises a sound absorber material.

**[Claim 37]** A dashmat according to claim 36 wherein the sound absorber material comprises a low density, porous material.

**[Claim 38]** A dashmat according to claim 37 wherein the sound absorber material is selected from the group consisting of an expanded flexible polymer, a flexible fibrous material, a non-woven glass fiber mat, and a shoddy cotton.

**[Claim 39]** A dashmat according to claim 36 wherein the dashmat has a layer of sound adsorbing material and the acoustic seal sound absorber material is integrally formed with the sound absorbing layer of the dashmat.

**[Claim 40]** A dashmat according to claim 36 wherein the acoustic seal sound absorber material is formed separately from the dashmat.

**[Claim 41]** A dashmat according to claim 40 wherein the dashmat has a layer of sound adsorbing material and the acoustic seal sound absorber material is fastened to the sound absorbing layer.

**[Claim 42]** An acoustic seal for surrounding an opening in a substrate having an obverse surface and a reverse surface, and the acoustic seal extends outwardly from the obverse surface of the substrate;

wherein the acoustic seal has sound absorbing and sound barrier characteristics to attenuate sound that passes through the opening in the substrate and above the obverse surface of the substrate;

whereby the acoustic seal interrupts the transmission of sound through the opening in the substrate from the obverse side of the substrate.

**[Claim 43]** An acoustic seal according to claim 42 wherein the acoustic seal further comprises an upwardly extending side wall and a top wall formed of a sound barrier material and the top wall has an opening therein.

**[Claim 44]** An acoustic seal according to claim 43 wherein the sound barrier material comprises a dense, resilient, flexible synthetic plastic.

**[Claim 45]** An acoustic seal according to claim 43 wherein the sound barrier material is selected from the group consisting of a filled thermoplastic elastomer, an unfilled thermoplastic elastomer, an elastomer-modified polyurethane, a thermoset plastic, a polyurethane, and a thermoplastic.

**[Claim 46]** An acoustic seal according to claim 43 wherein the acoustic seal side wall is integrally formed with the substrate.

**[Claim 47]** An acoustic seal according to claim 43 wherein the acoustic seal side wall is formed separately from the substrate.

**[Claim 48]** An acoustic seal according to claim 42 wherein the acoustic seal further comprises a sound absorber material.

**[Claim 49]** An acoustic seal according to claim 48 wherein the sound absorber material comprises a low density, porous material.

**[Claim 50]** An acoustic seal according to claim 48 wherein the sound absorber material is selected from the group consisting of expanded flexible polymer, a flexible fibrous material, a non-woven glass fiber mat, and a shoddy cotton.

**[Claim 51]** An acoustic seal according to claim 48 wherein the sound absorber material is integrally formed with the substrate.

**[Claim 52]** An acoustic seal according to claim 48 wherein the sound absorber material is formed separately from the substrate.

**[Claim 53]** An acoustic seal according to claim 47 wherein the sound absorber material is fastened to the substrate.